② $f(x) = a \cdot b^x$

$(-1, 4)$

$(0, 2)$

$2 = a \cdot b^0$

$2 = a$

$f(x) = 2 \cdot b^x$

$4 = 2 \cdot b^{-1}$

$2 = \frac{1}{b}$

$\frac{1}{2} = b$

$$f(x) = 2 \cdot \left(\frac{1}{2}\right)^x$$

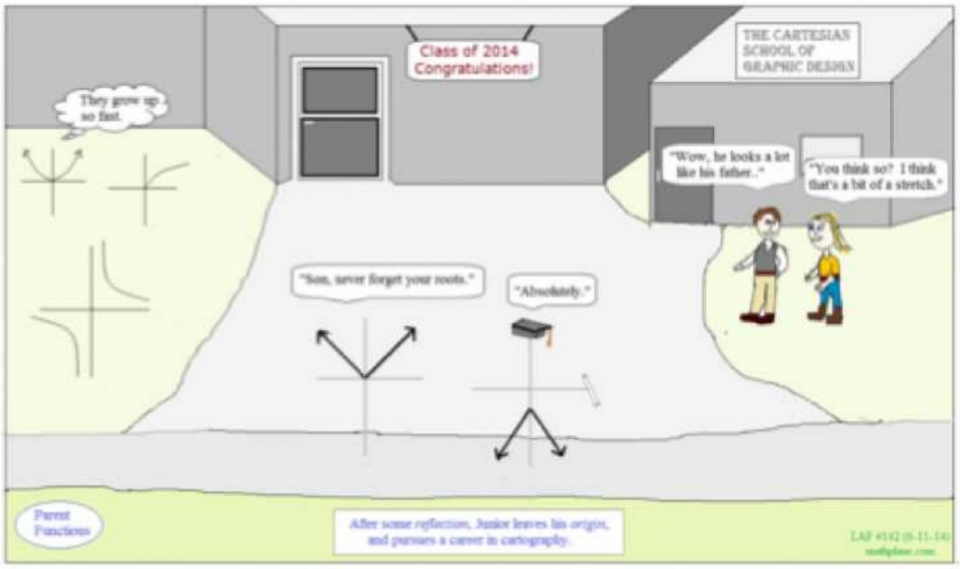
11.) $\dfrac{f(1) - f\left(\frac{1}{2}\right)}{1 - \frac{1}{2}}$

$\dfrac{\left(2 - \frac{13}{8}\right)}{\frac{1}{2}}$

$\dfrac{\frac{16}{8} - \frac{13}{8}}{\frac{1}{2}} = \frac{3}{8} \div \frac{1}{2}$

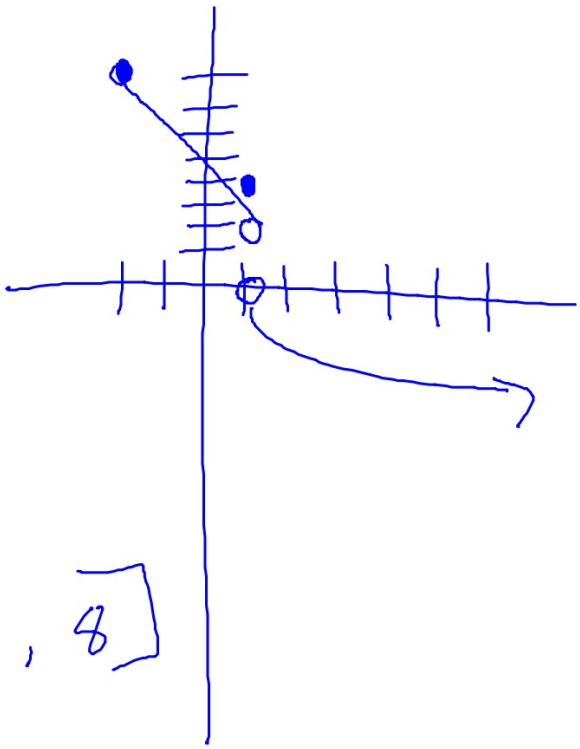
$\frac{3}{8} \cdot \frac{2}{1} = \boxed{\frac{3}{4}}$

Functions Review



ex: Sketch. Then state the domain and range in any notation.

$$y=\begin{cases}-2x+4, & -2\le x<1\\ 3x+1, & x=1\\ -\sqrt{x-1}, & x>1\end{cases}$$



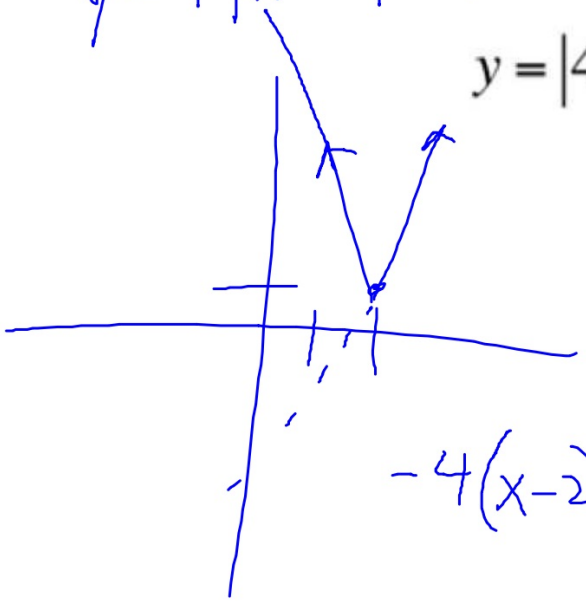
$D:[-2,\infty)$

$R:(-\infty,0)\cup(2,4]$

ex: Rewrite the absolute value function as a piecewise function.

$y = 4|x-2|+1$ $\quad (4x-8)+1$

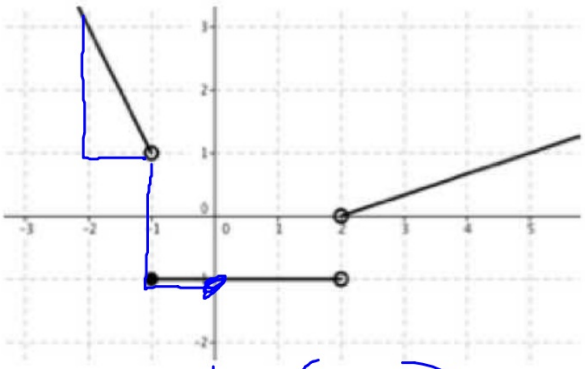
$$y = |4x-8|+1$$



$-4(x-2)+1$

$$y = \begin{cases} -4x+9 & x < 2 \\ 4x-7 & x \geq 2 \end{cases}$$

ex: Write the equation of the piecewise function.



$$f(x)=\begin{cases} -2x-1 & x<-1 \\ -1 & -1\le x<2 \\ \frac{1}{3}x-\frac{2}{3} & x>2 \end{cases}$$

$m=\frac{1}{3}$ (2, 0)

$y=mx+b$

$0=\frac{1}{3}(2)+b$

$-2/3=b$

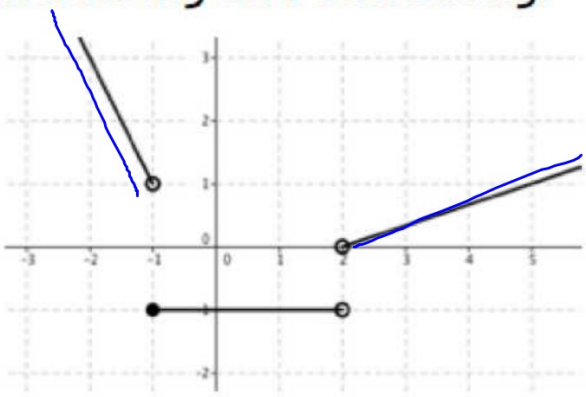
D: $\{x \mid x\neq 2\}$

$(-\infty, 2)\cup(2,\infty)$

R: $\{y \mid y=-1 \text{ or } y>0\}$

$[-1]\cup(0,\infty)$

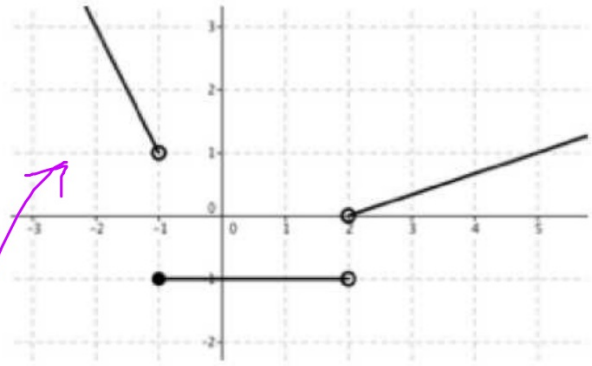
ex: Determine the open intervals, if any, on which the curve is increasing and decreasing.



incr : $(2, \infty)$

decr : $(-\infty, -1)$

ex: Determine the intervals, if any, on which the curve is positive and negative.



pos: $(-\infty, -1) \cup (2, \infty)$

neg: $[-1, 2)$

ex: Write an equation with the given characteristics:

- Parent: Quadratic
- Right 2
- Vertical stretch by a factor of 5

$$y = 5(x-2)^2$$

ex: List the transformations.

$$y = -1 - 5[4 - 2x]$$

$y = -5[-2(x-2)] - 1$

right 2

down 1

vertical stretch by 5

horizontal shrink by 1/2

reflect with origin

ex: Even, odd or neither?.

$$f(x) = \frac{x + 5x^7}{x^3 - 6x}$$

$$f(-x) = \frac{-x + 5(-x)^7}{(-x)^3 - 6(-x)}$$

even

$f(-x) = f(x)$

Symmetry:

$x^2 + y^4 = 30$

x-axis
y-axis
origin

x-axis
y-axis
origin
$y = x$